

Amendments to the Claims

Please amend the claims according to the following listing of the claims.

1. (Currently Amended) A method for making a modified epoxy, comprising the steps of:
  - a) mixing solvents and clay particles of a dimension in the nanometer range, to form a clay solution comprising clay particles of a dimension in the nanometer range and agglomerates of clay particles;
  - b) generating a flow of clay solution and submitting said flow to: (1) high pressure to generate high velocity and to allow shearing in the clay solution to occur; (2) a region of obstacles allowing the agglomerates of clay particles to be broken down; and (3) a sudden lower pressure, yielding a dispersed clay solution having a fine and homogeneous distribution of clay particles of a dimension in the nanometer range in the clay solution; and
  - c) mixing the dispersed clay solution with at least a pristine epoxy.
2. (Cancelled)
3. (Previously Presented) The method according to claim 1, wherein said step a) comprises incorporating a first part of the pristine epoxy and said step c) comprises mixing the dispersed clay particles solution with a remaining part of the pristine epoxy.
4. (Original) The method according to claim 1, wherein said step a) comprises mixing with at least one of mechanical and ultrasonic mixing.
5. (Original) The method according to claim 1, wherein said step b) comprises submitting the clay solution to a pressure of about 20,000 psi in tubes of a diameter of about 0.1 mm.
6. (Original) The method according to claim 1, wherein said step b) comprises

exfoliating the clay particles in the solution.

7. (Original) The method according to claim 1, wherein said step c) comprises mixing the dispersed clay particle solution with the pristine epoxy and curing agents to yield a solid epoxy material.
8. (Original) The method according to claim 1, whereby the modified epoxy comprises agglomerates of less than about 1  $\mu\text{m}$  and agglomerates of a maximum diameter comprised between about 1  $\mu\text{m}$  and 2  $\mu\text{m}$ .
9. (Original) The method according to claim 1, whereby the modified epoxy has enhanced viscoelastic properties, improved fracture toughness, and critical strain energy release rate compared to the pristine epoxy.
10. (Previously Presented) The method according to claim 9, whereby the modified epoxy has an increase in  $K_{1C}$  and  $G_{1C}$  of up to 2 and 3 times respectively with respect to the pristine epoxy, at about 1 wt % of clay loading.
11. (Original) The method according to claim 1, whereby the modified epoxy has enhanced barrier properties, including water absorption resistance, adhesion strength and flammability resistance, with respect to the pristine epoxy.
12. (Original) The method according to claim 1, wherein a mixture of clay and epoxy obtained has a stability over an extended period of time.
13. (Original) The method according to claim 1, wherein the pristine epoxy is a rubber-modified epoxy resin.

14 – 19. (Cancelled)

20. (Previously Presented) A modified epoxy produced from a pristine epoxy, the modified epoxy having at least higher barrier properties and thermal resistance than the pristine epoxy, the modified epoxy produced by :
  - a) mixing solvents and clay particles of a dimension in the nanometer range, to form a clay solution, agglomerates of clay particles forming in the clay solution
  - b) generating a flow of clay solution and submitting said flow to: (1) high

pressure; (2) high velocity and breaking impacts in a region of obstacles to allow the agglomerates to be broken down and to :(3) a sudden lower pressure, yielding a dispersed clay solution having a fine and homogeneous distribution of clay particles of a dimension in the nanometer range in the clay solution; and

c) mixing the dispersed clay solution with at least part of the pristine epoxy.

21. (Original) The modified epoxy according to claim 20, comprising finely dispersed clay agglomerates of less than about 1  $\mu\text{m}$  and agglomerates of a maximum diameter between about 1  $\mu\text{m}$  and 2  $\mu\text{m}$ .

22. (Previously Presented) The modified epoxy according to claim 20, wherein a content of about 1 wt % of clay loading yields an increase in a fracture toughness, with an increase in  $K_{1C}$  and  $G_{1C}$  of up to 2 and 3 times, with respect to the pristine epoxy respectively.

23. (Original) The modified epoxy according to claim 21, wherein said pristine epoxy is a rubber-modified epoxy.

24. (Original) The modified epoxy according to claim 21, further comprising additives.

25. (Cancelled)

26. (Previously Presented) The modified epoxy according to 23, wherein the modified epoxy has an increase in  $K_{1C}$  and  $G_{1C}$  of up to 2.2 and 7.6 times respectively at 6-phr organoclay loading and 20-phr CTBN compared with the pristine epoxy.

27. (Previously Presented) The method according to claim 13 , wherein the modified epoxy has an increase in  $K_{1C}$  and  $G_{1C}$  of up to 2.2 and 7.6 times respectively at 6-phr organoclay loading and 20-phr CTBN compared with the pristine epoxy.

28. (New) A composite epoxy comprising clay agglomerates of less than about 1  $\mu\text{m}$  and clay agglomerates of a maximum diameter comprised between about 1  $\mu\text{m}$  and 2  $\mu\text{m}$  in a pristine epoxy.

29. (New) The composite epoxy according to claim 28, said composite epoxy having

an increase in  $K_{1C}$  and  $G_{1C}$  of up to 2 and 3 times respectively with respect to the pristine epoxy, at about 1 wt % of clay loading.

30. (New) The composite epoxy according to claim 28, said composite epoxy having an increase in  $K_{1C}$  and  $G_{1C}$  of up to 2.2 and 7.6 times respectively at 6-phr organoclay loading and 20-phr CTBN compared with the pristine epoxy.
31. (New) The composite epoxy according to claim 28, wherein said pristine epoxy is a rubber-modified epoxy resin.
32. (New) The composite epoxy according to claim 28, wherein said pristine epoxy is a rubber-modified epoxy resin, the composite epoxy having an increase in  $K_{1C}$  and  $G_{1C}$  of up to 2.2 and 7.6 times respectively at 6-phr organoclay loading and 20-phr CTBN compared with the pristine epoxy.